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**Title:** Assessing the Validity of the Mental Health-Related Survey in Collegiate Student-Athletes

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# Assessing the Validity of the Mental Health-Related Survey in Collegiate Student-Athletes

**Context:** Mental health screenings are recommended during preparticipation physical examinations. The Mental Health-Related Survey (MHRS), a 9-item questionnaire adapted from the 18-item Mental Health Screening Form-III, is suggested in three consensus and/or position statements. However, there is no evidence on the effectiveness of the MHRS.

**Objective:** To assess the validity of the MHRS for mental health screening in collegiate student-athletes.

**Design:** Cross-sectional study.

**Setting:** University athletic program.

**Patients:** 515 NCAA Division II student-athletes (20±1 years old).

**Main Outcome Measures:** Participants completed the MHRS, PHQ-9 for depression, and GAD-7 for anxiety. A stratified sample underwent a neuropsychiatric interview (MINI). Descriptive statistics and Pearson correlations were performed. An area under the curve (AUC) analysis compared the MHRS to the MINI. Validity was determined using sensitivity, specificity, Youden's index, predictive values, and accuracy.

**Results:** 322 student-athletes (62.5%) indicated 'yes' to one or more items on the MHRS, suggesting they would require a mental health referral. Women indicated more 'yes' answers than men ($p<0.001$). Average scores were 2.21±3.06 on the PHQ-9 and 2.66±3.87 on the GAD-7. Using a cut score of 6, 68 individuals (13.2%) reported clinically relevant depression, and 76 (14.8%) reported anxiety. PHQ-9 and GAD-7 scores strongly correlated with MHRS scores (PHQ-9: $r=0.713$, $p<0.001$; GAD-7: $r=0.745$, $p<0.001$). The MHRS had a specificity of 24.6%, a sensitivity of 93.9%, and overall accuracy of 40.14%. The AUC score was 0.762. We identified a new cutoff score for the MHRS of ≥4; however, the sensitivity of 63.6% and specificity of

76.3% raise concerns regarding how well this tool can rule out and in clinically significant symptoms of mental health conditions.

**Conclusion:** Most student-athletes indicated 'yes' to at least one item on the MHRS, warranting a mental health referral. The MHRS showed high sensitivity but low specificity, indicating low clinical utility as a screening tool.

**Keywords:** behavioral health, screening, preparticipation exam

**Key points:**

1. While a majority of collegiate student-athletes (62.5%) indicated at least one symptom on the Mental Health-Related Survey (MHRS) that would have warranted a referral, only 13.2% reported clinically relevant depression, and 14.8% reported clinically relevant anxiety.
2. The MHRS has a specificity of 24.6% and a sensitivity of 93.9%, with an overall accuracy of 40.1% compared to a neuropsychiatric interview.
3. Based on our data, the MHRS, a 9-item questionnaire recommended in three consensus or position statements, has low clinical utility and is not recommended for preventative mental health screening.

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# Assessing the Validity of the Mental Health-Related Survey in Collegiate Student-Athletes

## INTRODUCTION

The preparticipation physical evaluation is critical in identifying collegiate student-athletes' preparedness for safe participation in sports.[1] Mental health, as an influential factor of this preparedness, should be carefully assessed in this population during the preparticipation physical evaluation, given the existing prevalence rates of depressive and anxious symptomatology among collegiate student-athletes. The National Collegiate Athletic Association (NCAA), in collaboration with the American College Health Association, identified that 20% of female, 13% of male, and 40% of non-binary collegiate student-athletes reported debilitating depression, and 41% of female, 22% of male, and 50% of non-binary collegiate student-athletes reported overwhelming anxiety.[2] Failure to identify these mental health concerns before, during, or after their respective sports seasons may lead to a deterioration in their overall health and the occurrence of mental health emergencies such as suicide attempts.[3] For this reason, the second edition of the Inter-Association Consensus Document on Mental Health Best Practices recommends that the interdisciplinary healthcare team for collegiate student-athletes, which should include athletic trainers (ATs), use validated mental health questionnaires to screen their student-athletes at least once annually with "validated," being defined as "[the existence of] reputable scientific evidence that the tool measures what it says it is supposed to measure."[4]

The National Athletic Trainers' Association (NATA) position statement on preparticipation physical evaluations and disqualifying conditions echoes the sentiment that mental health status questions should be considered during the health history portion of the preparticipation physical evaluation.[1] The position statement recommends using the Mental Health-Related Survey (MHRS). The MHRS is also a recommended screening tool in the Inter-

Association Consensus Statement on Psychological Considerations for student-athletes within the collegiate[5] and secondary school settings.[6] The MHRS is a 9-item, binary (yes/no) tool adapted from the 18-item Mental Health Screening Form-III (MHSF-III). Interestingly, the MHSF-III was initially designed as a non-specific mental health questionnaire for chemically dependent persons seeking admission to substance abuse programs.[1,7] To date, there is no readily available evidence for ATs on the processes through which the MHRS was adapted from the MHSF-III. There is also no existing information on the validation or reliability of the MHRS in identifying collegiate student-athletes with mental health concerns since its inclusion in the aforementioned position and consensus statements from 2013, 2014, and 2015.[1,5,6] A 2016 publication highlighted the concern surrounding the validity and appropriateness of the MHRS in the athlete population and called for further examination of the patient-reported outcome measure.[8]

The healthcare team, including the AT, should feel confident in the questionnaires that they integrate as part of their mental health screening processes to appropriately and efficiently identify, follow up with, and refer any student-athletes who are struggling with their mental health. Specifically, the MHRS needs to be evaluated for how well it can identify collegiate student-athletes with mental health symptoms in comparison to other validated questionnaires of depression and anxiety symptoms.[8] The purpose of this study was to examine the validity of the MHRS as a tool in the mental health screening of collegiate student-athletes. It was hypothesized that MHRS would perform with a high sensitivity given that its items are broad enough to collectively encapsulate symptoms of various mental health conditions but with a low specificity due to the phrasing for many of its items being attributed to routine experiences associated with participation in college and/or sports.

## METHODS

### Study Design

This cross-sectional study assessed the validity of the MHRS in collegiate student-athletes. The study involved administering the MHRS alongside the Patient Health Questionnaire for depression (PHQ-9) and Generalized Anxiety Disorder 7-item Scale (GAD-7) with a follow-up assessment guided by the Mini-International Neuropsychiatric Interview (MINI) for assessment of mental health disorders. Independent variables included sex, sport, and meeting the criteria for mental health conditions using the MINI, while the dependent variable was the total MHRS score.

### Participants

This study invited all collegiate student-athletes from a single NCAA Division II university in the Northeastern United States to participate during the in-person fall preparticipation physical evaluation. Collegiate student-athletes under 18 years of age were excluded. Institutional ethical review board approval was obtained prior to the study.

### Instrumentation

#### *Mental Health-Related Survey (MHRS)*

The MHRS is a 9-item, binary questionnaire with yes/no response options. The MHRS was adapted from an original tool titled the MHSF-III, which was developed in 2001 for utilization within the chemically dependent population (i.e., patients diagnosed with alcohol or substance use disorders).[7] The MHSF-III was validated in 111 patients undergoing treatment within an in-patient therapeutic community for individuals with substance use disorders.[9] However, the nine items in the MHRS, which are displayed in the position and consensus statements,[1,5,6] do not match any of the original MHSF-III questions. While these position and

consensus statements indicate the MHRS was adapted with permission from *Alcohol Treatment Quarterly*, the publication source of the original MHSF-III survey, it is unclear how the adaptation or changes to the MHSF-III occurred.

For clinical use of the MHRS within the student-athlete population, the consensus statements on psychological concerns in student-athletes recommend that "any affirmative answers in the mental health section of the preparticipation physical examination should be brought to the attention of the team physician, so that [they] may discuss them with the student-athlete and ascertain if any follow-up evaluation, care, or medication is required"[5] with similar directives in the position statement on preparticipation physical evaluations stating that "any yes answers should trigger a private discussion between the physician and athlete. The physician can then determine if the athlete needs to be referred for evaluation by a mental health care professional."[1] This suggests the MHRS has a cut score of 1 based on the referral process.

***Patient Health Questionnaire-9 (PHQ-9)***

The PHQ-9 is a 9-item self-report tool validated as a reliable screening measure for major depressive disorder in the general[10] and athletic population.[11] The tool asks the individual to express symptom frequency from four options ranging from none (0) to nearly every day (4). A total score is calculated to classify depression symptom severity in the general population as follows: 0 (none), 1–4 (minimal), 5–9 (mild), 10–14 (moderate), 15–19 (moderately severe), and 20–27 (severe).[10] A total score of ≥10 demonstrates 88% sensitivity and specificity compared to a structured neuropsychiatric interview for diagnosing major depression.[10,12] In the present study, any participant scoring ≥6 was referred to medical personnel for clinically relevant depression based on prior validation in the collegiate student-athlete population.[11] Student-athletes scoring in this range were privately consulted by the AT and offered a mental health referral. Any

student-athlete indicating suicidal ideation on the final item of the PHQ-9, regardless of the total score, was automatically referred.

***Generalized Anxiety Disorder 7-Item Scale (GAD-7)***

The GAD-7 is a brief, self-report tool validated as a reliable measure of anxiety symptoms in the general population.[13] The tool comprises 7 items that are scored across a 3-point scale, resulting in a total score range of 0-21. Total scores classify anxiety severity as follows: 0 (none), 1–4 (minimal), 5–9 (mild), 10–14 (moderate), and 15–21 (severe).[13] A score ≥10 demonstrates 89% sensitivity and 82% specificity in the general population, compared to a structured psychiatric interview as the criterion standard for generalized anxiety disorder. In this study, a score of 6 or higher was used to indicate clinically relevant anxiety symptoms, based on validation in the collegiate student-athlete population.[14]

***Mini-International Neuropsychiatric Interview (MINI)***

The Mini-International Neuropsychiatric Interview 6.0 (MINI) is a brief, structured diagnostic neuropsychiatric interview designed to identify common psychiatric disorders based on the American Psychiatric Association's Diagnostic Statistical Manual, 5th Edition (DSM-5) criteria.[2,15] It was developed to provide a shorter, yet accurate alternative to traditional clinical interviews for use in research and clinical settings.[16] The MINI is widely recognized as a reference standard for validating mental health assessments.[12,16,17] For this study, the MINI modules for major depressive disorder, generalized anxiety disorder, social anxiety disorder, and panic disorder were administered, assessing symptoms over the past two weeks against DSM-5 criteria. Participants meeting the criteria for any disorder were classified as "positive" for that condition.[16] Those meeting the criteria or reporting suicidal ideation were referred to counseling services. The MINI served as the reference standard to assess whether student-athletes met the criteria for clinical depression and anxiety and to evaluate the validity of the MHRS.

158 **Procedures**

159 Student-athletes completed the PHQ-9 and GAD-7 as part of their annual preparticipation
160 physical evaluation. Additionally, student-athletes completed the MHRS for the purpose of this
161 study. A consent form was provided at the preparticipation physical evaluation that outlined the
162 study's purpose and ensured access to mental health screening results that were limited to ATs
163 and researchers. Consenting participants completed the surveys electronically, including
164 demographic questions, administered by the institution's athletic trainers. Names were included
165 on the screening tools to allow ATs to identify student-athletes with clinically significant
166 symptoms on the PHQ-9 or GAD-7. Those identified were offered referrals to on-campus
167 counseling services. Athletic trainers were trained in mental health screening and referral
168 protocols in alignment with the institution's mental health management plan.

169 After completing the screenings, 147 (28.5%) student-athletes were selected for the MINI
170 using a two-phase random stratified sampling method. This approach ensured representation
171 across the full range of PHQ-9 and GAD-7 scores, capturing participants with diverse mental
172 health symptoms while maintaining proportional representation by sport. For a detailed
173 description of the stratified sampling methodology, see Keenan et. al (2023).[11] Graduate student
174 clinicians from the Master of Counseling, Social Work, or School Counseling programs at the
175 participating institution were recruited as research assistants to administer the MINIs. All
176 research assistants completed coursework on clinical interviewing and participated in
177 standardized training modules. The training was supervised by a licensed psychologist and
178 required the research assistants to administer two mock MINI interview sessions prior to data
179 collection. The student-athletes participating in the MINI received a $10 gift card as an incentive.
180 The research assistants were independent of the athletics and athletic training departments and
181 were blinded to the MHRS and other screening results.

## Data Analysis

All data were downloaded and exported into SPSS (version 29; IBM Corp, Armonk, NY). We performed descriptive statistics to examine the demographics, main outcome measure scores, and the MINI. A Mann-Whitney U test was performed to compare data between genders (men and women) for the outcome variables. Two Pearson correlations were performed to explore the relationship between the MHRS and previously validated mental health screening tools (PHQ-9 and GAD-7). Next, we performed an area under the curve analysis to indicate the maximal discrimination of the MHRS between student-athletes who met and did not meet the criteria for any mental health condition using the MINI. The cutoff score for the MHRS was determined using the respective sensitivity, specificity, and Youden's index. Finally, we performed a 2 x 2 contingency table for the MHRS compared to the MINI to calculate the positive and negative predictive values, false positive and negative rate, and overall accuracy. The significance level was set at $P < .05$ a priori.

## RESULTS

In total, 515 NCAA Division II student-athletes (age=20±1 years, range=18-31 years) participated in the mental health screening. The student-athletes from football represented the largest number of participants (n=90, 17.5%) and participants were evenly distributed amongst school classifications. A little over 10% (n=54) of the participants reported going through a recent (within the past 3 months) life transition or life event that they felt negatively impacted their current emotional or psychological state. Full demographics are available in Table 1.

## Mental Health-Related Survey (MHRS)

On the MHRS, 193 student-athletes (37.5%) indicated "no" on all items, while 322 student-athletes (62.5%) marked at least one item that warranted a referral to a licensed mental health care professional. Figure 1 displays the percentage of 'yes' answers per participant and

Table 2 provides the number of 'yes' answers per statement. Overall, participants averaged a score of 1.60±1.80 on the MHRS. A Mann-Whitney U test indicated that the MHRS total score was significantly greater (U=21220, z=-7.035, p<0.001) for women (median=2; IQ=0-3) compared to men (median=0; IQ=0-2).

**Depression and Anxiety Screening**

The participants had a mean score of 2.21±3.06 (range=0-18) on the PHQ-9 and a mean score of 2.66±3.87 (range=0-20) on the GAD-7. Overall, on these instruments, 41.4% (n=213) and 42.5% (n=219) of participants did not indicate symptoms warranting referral for depression and anxiety, respectively. Using the cut score of 6 on the PHQ-9 and GAD-7, we identified 68 individuals (13.2%) reporting clinically relevant depression symptoms and 76 individuals (14.8%) reporting clinically relevant anxiety symptoms on the PHQ-9 and GAD-7, respectively. Total scores from the PHQ-9 and GAD-7 had strong, positive correlations with the MHRS total score (PHQ-9: r=0.713, p<0.001; GAD-7: r=0.745, p<0.001).

**Neuropsychiatric Interview Findings**

In total, 147 neuropsychiatric evaluations were completed with 33 participants screening positive for at least one mental health condition. Seventeen participants screened positive for one condition, 13 were positive for two conditions, two screened positive for three conditions, and one participant screened positive for four mental health conditions. One hundred and fourteen student-athletes did not screen positive for any mental health condition during the MINI interview. Overall, 20 (13.6%) individuals met the criteria for panic disorder, 19 (13.0%) met the criteria for GAD, nine (6.1%) met the criteria for major depressive disorder, and five (3.4%) met the criteria for social anxiety disorder. Specific to major depressive disorder, there were 122 (83.0%) individuals who reported no current or previous history of depression; however, 16 individuals had a past or recurrent depression diagnosis without current symptoms. Of the nine

particiapnts who met the criteria for current major depressive disorder in this study, they were further classified as current only (n=1), current and past (n=1), current and recurrent (n=2), or current, past, and recurrent (n=5).

**Instrument Results and Clinical Utility**

The data from the MHRS was compared to the gold standard, the MINI diagnostic interview, to assess clinical utility. The Youden's index for the MHRS using a cutoff score of 1 was 0.185, indicating no diagnostic value. We identified a specificity of 24.6% and sensitivity of 93.9% for the MHRS (Figure 2) with a 75.4% false positive rate and 6.1% false negative rate. The overall accuracy of the MHRS was 40.14%. The 2 x 2 contingency table is reported in Table 3. Positive predictive value of 26.5% and negative predictive value of 93.3%. The area under the curve score was 0.762, suggesting the capability for fair discrimination. Based on Youden's index, the cutoff score for mental health concerns was a total score of ≥4 on the MHRS in student-athletes, corresponding to a sensitivity of 63.6% and specificity of 76.3% (Table 4).

**DISCUSSION**

Our purpose was to validate the MHRS in the collegiate student-athlete population due to the emphasis placed on the tool in the position and consensus statements.[1,5,6] While a majority of collegiate student-athletes (62.5%) indicated 'yes' to at least one item on the MHRS that would have warranted a referral, only 13.2% reported clinically relevant depression, and 14.8% reported clinically relevant anxiety. The overall accuracy of the MHRS was 40.1% when compared to a neuropsychiatric interview. We identified that the MHRS has a specificity of 24.6% and a sensitivity of 93.9% when using the cut score of ≥1, suggesting that it is a good tool to rule out those who may need a referral but has low diagnostic value to rule in and identify

individual mental health concerns. While the MHRS is recommended as a screening tool in the position and consensus documents, our data suggests that the instrument has poor clinical utility.

**Screening for Mental Health Concerns**

When screening for mental health conditions, such as depression and anxiety, it is ideal to use screening instruments that accurately reflect the diagnostic criteria of these conditions in order to increase the accuracy of the screening and decrease the number of false positives. Previous research identified that only 49% of collegiate ATs were screening for behavioral health concerns using validated tools.[18] Both the PHQ-9 and GAD 7 have been found to be reliable and validated instruments for screening in an athletic population, and were developed based on the DSM-5 criteria.[11,14] When using these validated instruments, we identified that 13.2% of participants reported clinically relevant depression symptoms and 14.8% reported clinically relevant anxiety symptoms.

Our results demonstrated that the total scores from the PHQ-9 and GAD-7 had strong, positive correlations with the MHRS total score. However, we identified a low specificity for the MHRS, suggesting that practitioners who utilize this instrument are more likely to receive a false positive result. This is problematic because the medical staff will need to direct considerable resources to the follow-up process with student-athletes who are reporting well below clinically relevant symptoms. There are other valid mental health screening tools widely and freely available, such as the PHQ-9 and GAD-7. The use of the MHRS is not recommended for mental health screening.

**Mental Health-Related Survey**

On the MHRS, 37.5% of participants indicated “no” on all items, while 62.5% indicated at least one item on the MHRS, which would warrant a referral to a licensed mental health care professional. There was a significant difference between genders, with women having a higher

average score on the MHRS compared to men. This is consistent with previous research with athletes who identify as women endorsing more symptoms of mental health distress than men.[19-21]

The MHRS, as currently recommended (any score >1 equates to a referral to a licensed mental healthcare provider), has poor specificity, which may lead a healthcare provider to potentially place excessive demands on mental health resources. Given the high false positive rates of the MHRS, clinicians using this survey may feel compelled to utilize a different cutoff or clinician utility approach to the MHRS. We identified that a cutoff score of ≥4 for the MHRS has the most clinical utility; however, the sensitivity of 63.6% suggests uncertain predictive value, and a specificity of 76.3% would suggest a likely diagnosis; however, a strong instrument would have a specificity and sensitivity of 90% to suggest very likely predictive value.[22] Donohue et al. (2019)[23] points out, "consistent with this guideline, some administrators of universities have initiated procedures to augment physical safety screens with non-empirically validated assessments of mental health while others have incorporated mental health screening instruments that are psychometrically validated in non-athlete populations" (pg. 562). Therefore, based on the data, the MHRS is not recommended for preventative screening.

The results from this study indicate that the MHRS has low diagnostic value including construct validity compared to the PHQ-9 and GAD-7, vague content validity in terms of the high false positive rate, and weak criterion validity with an overall accuracy of 40%. These findings lead to concerns about the clinical utility of the MHRS. Clinical utility encompasses three main areas for healthcare providers including acceptability, feasibility, and appropriateness.[24] The MHRS has moderate acceptability. Acceptability involves the user experience (patient and AT) and references factors such as length of the tool, time to complete,

and clarity of what the question is asking the patient. The MHRS has good feasibility as it is easy to implement and is quick to score.

However, our results bring into question the appropriateness of the MHRS due to the poor metrics associated with the cutoff scores and high false positive rates. When compared to the MINI diagnostic interview, the MHRS had a significant false positive rate, meaning that the MHRS incorrectly indicated that student-athletes were experiencing diagnosable mental health conditions. It is important for ATs and other healthcare providers to use accurate and effective screening measures when assessing student-athlete mental health to provide the best care possible. It is evident that the MHRS has low appropriateness regarding the practical aspects of the patient-reported outcome in a clinical environment and may not be an adequate measure as a preparticipation mental health screener.

***Limitations***

Our study does have limitations worth noting. As our data collection occurred at only one NCAA Division-II institution, results may not be accurate for other competition levels and age groups, particularly youth and secondary school student-athletes. Furthermore, we validated the MHRS against two commonly used mental health screeners, the PHQ-9 and GAD-7, but we did not evaluate the clinical utility of the MHRS in identifying disordered eating, insomnia, alcohol and substance use, attention-deficit/hyperactivity disorder (ADHD), or other mental health disorders. Given the brevity of the MHRS and our current findings, it is unlikely this survey would produce high specificity in discriminating against these mental health disorders in the student-athlete population. However, further research is necessary to confirm.

Additionally, it has been noted in the literature student-athletes often under-report symptoms of mental health.[25] It is possible the MHRS results in our study are an under-representation of the true symptoms student-athletes may be experiencing during the

preparticipation physical evaluation. However, as our methods reflect the typical preparticipation mental health screening process in the collegiate setting, our results are likely an accurate representation and mirror the screening results that would occur within a collegiate setting. Despite these limitations, given that the MHRS was developed for alcohol screening and other validated measures appropriate for the athletic population exist, the athletic healthcare team (i.e. athletic trainers, team physicians and licensed mental health professionals) should identify screening tools most appropriate for their patient population.

***Future Research***

Future researchers should seek to confirm our findings in other sub-populations, such as secondary school and professional athletes, as well as other collegiate athletic populations including NCAA Division I, III, junior colleges and the NAIA institutions. The NATA recommends mental health screening at the secondary school level, and future research should focus on validating appropriate measures in this population, such as the PHQ-9 and GAD-7.[6] Lastly, future research should continue to focus on validating mental health measures in the student-athlete population for other common mental health conditions such as disordered eating behaviors, insomnia, alcohol and substance use, and ADHD. As the MHRS has been recommended for use in three statements published in the *Journal of Athletic Training*, we recommend that the NATA Foundation Pronouncements Committee update these guiding documents to reflect best practices in screening utilizing validated measures for mental health concerns.

## CONCLUSIONS

This was the first study to investigate the clinical utility of the MHRS in a collegiate student-athlete population. The majority of participants in our study indicated ‘yes’ to at least one item on the MHRS that warranted a referral to a mental health professional, with women

having significantly more symptoms on the MHRS compared to men. Out of 147 psychological evaluations, 33 participants screened positive for at least one mental health condition, with panic disorder and generalized anxiety disorder being the most common. The MHRS demonstrated high sensitivity but low specificity, resulting in a high false positive rate. The overall accuracy of the MHRS was 40.14%, with an area under the curve score of 0.762, indicating fair discrimination capability. The optimal cutoff score for identifying mental health concerns was determined to be ≥4 on the MHRS; however, the sensitivity of 63.6% and specificity of 76.3% at this cutoff score is a continued area of concern. The data highlights the low clinical utility of the MHRS as a screening tool. Other validated tools, such as the PHQ-9 and GAD-7, are recommended.

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**Table 1.** Demographic Information

| Demographics | Frequency n (%) |
|---|---|
| **Gender** | |
| Women | 291 (56.5%) |
| Men | 224 (43.5%) |
| **Sport** | |
| Football | 90 (17.5%) |
| Baseball | 34 (6.6%) |
| Women's Rugby | 34 (6.6%) |
| Women's Lacrosse | 32 (6.2%) |
| Women's Soccer | 32 (6.2%) |
| Women's Swimming & Diving | 29 (5.6%) |
| Field Hockey | 26 (5.0%) |
| Men's Soccer | 25 (4.9%) |
| Softball | 24 (4.7%) |
| Women's Track & Field | 23 (4.5%) |
| Men's Swimming & Diving | 22 (4.3%) |
| Women's Gymnastics | 21 (4.1%) |
| Women's Volleyball | 17 (3.3%) |
| Men's Track & Field | 16 (3.1%) |
| Cheerleading | 15 (2.9%) |
| Men's Basketball | 15 (2.9%) |
| Women's Cross Country | 13 (2.5%) |
| Women's Basketball | 10 (1.9%) |
| Women's Tennis | 9 (1.7%) |
| Men's Cross Country | 8 (1.6%) |
| Men's Golf | 7 (1.4%) |
| Women's Golf | 7 (1.4%) |
| Men's Tennis | 6 (1.2%) |
| **Race** | |
| White | 419 (81.4%) |
| Black or African American | 62 (12.0%) |
| Two or More Races | 27 (5.2%) |
| Asian | 6 (1.2%) |
| American Indian or Alaska Native | 1 (0.2%) |
| Native Hawaiian or Other Pacific Islander | 0 (0%) |
| **Ethnicity** | |
| Non-Hispanic | 495 (96.1%) |
| Hispanic | 20 (3.9%) |
| **Classification** | |
| First Year | 154 (29.9%) |
| Sophomore | 115 (22.3%) |
| Junior | 114 (22.1%) |
| Senior | 113 (21.9%) |
| Fifth Year | 14 (2.7%) |
| Graduate Student | 5 (1.0%) |

**Table 2.** Mental Health-Related Survey Data

| Statement | Yes | No |
|---|---|---|
| I often have trouble sleeping | 109, 21.2% | 406, 78.8% |
| I wish I had more energy most days of the week | 140, 27.2% | 375, 72.8% |
| I think about things over and over | 226, 43.9% | 289, 56.1% |
| I feel anxious and nervous much of the time | 99, 19.2% | 416, 80.8% |
| I often feel sad or depressed | 32, 6.2% | 483, 93.8% |
| I struggle with being confident | 128, 24.9% | 387, 75.1% |
| I don't feel hopeful about the future | 24, 4.7% | 491, 95.3% |
| I have a hard time managing my emotions (frustration, anger, impatience) | 54, 10.5% | 461, 89.5% |
| I have feelings of hurting myself or others | 10, 1.9% | 505, 98.1% |

**Table 3**. 2x2 Contingency Table

| | **MINI** – YES FOR ANY CONDITION | **MINI** – NO FOR ALL CONDITIONS | **Total** |
|---|---|---|---|
| **MHRS** - YES MARKED ON AT LEAST ONE ITEM | True positive (N=31) | False positive (N=86) | **117** |
| **MHRS** – NO MARKED FOR ALL ITEMS | False negatives (N=2) | True negatives (N=28) | **30** |
| **Total** | **33** | **114** | **147** |

**Table 4.** Sensitivity, Specificity, and Youden J Result of the MHRS

| Score | Sensitivity (%) | Specificity (%) | Youden's Index Result |
|---|---|---|---|
| -1.00 | 100 | 0 | .000 |
| .50 | 93.9 | 24.6 | .185 |
| 1.50 | 87.9 | 36.8 | .247 |
| 2.50 | 81.8 | 56.1 | .380 |
| 3.50 | 63.6 | 76.3 | .400 |
| 4.50 | 45.5 | 90.4 | .358 |
| 5.50 | 21.2 | 95.6 | .168 |
| 6.50 | 15.2 | 100 | .152 |
| 7.50 | 9.1 | 100 | .091 |
| 8.50 | 3.0 | 100 | .030 |
| 10.00 | 0 | 100 | .000 |

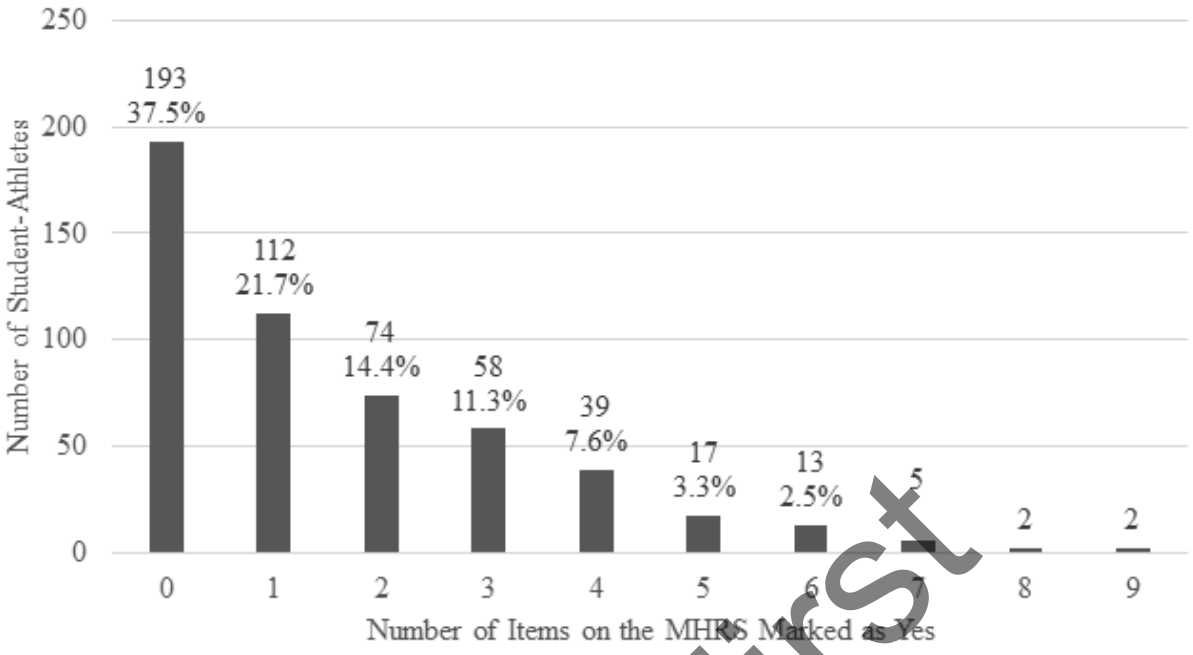


**Figure 1.** Mental Health-Related Survey Data

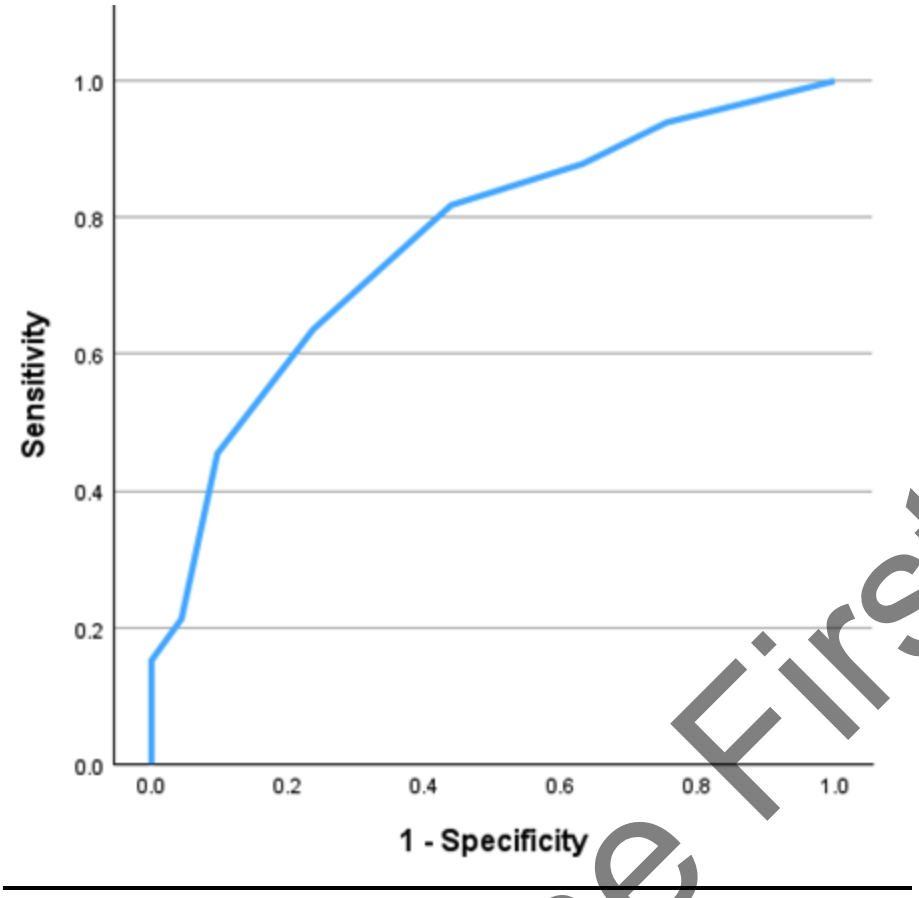


**Figure 2.** ROC Curve for the MHRS